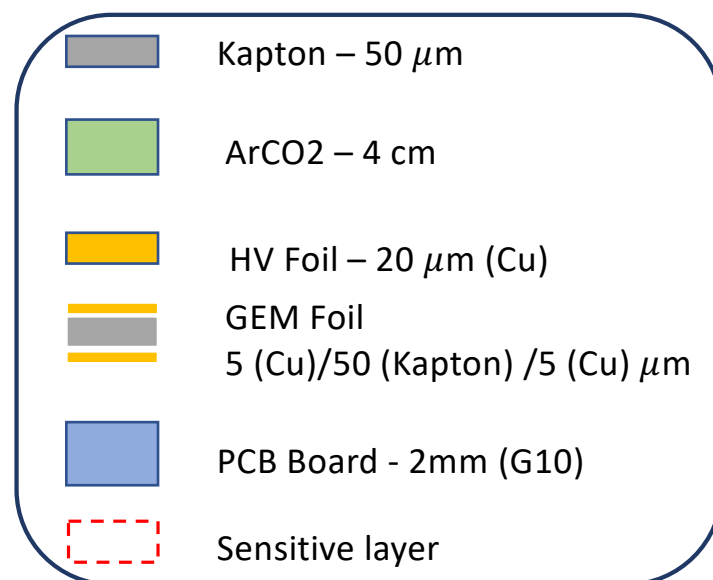
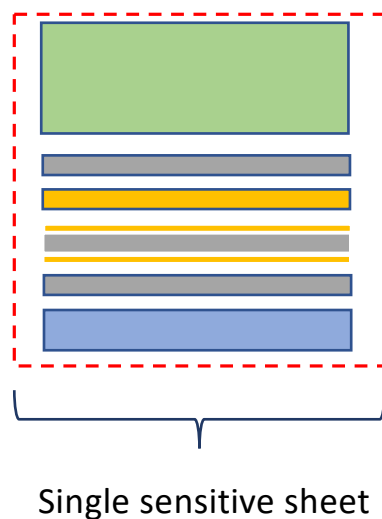


Detector Material

Component	Material	Radiation Length (%)
HV layer (from FGT)	5 μm Cu	0.035
	50 μm Kapton	0.017
u-Rwell	2x 5 μm Cu (70%)	0.049
	50 μm Kapton	0.036
Readout (from FGT)	5 μm Cu (20%)	0.007
	50 μm Kapton (20%)	0.003
	5 μm Cu (88%)	0.031
	50 μm Kapton	0.017
	2 x 5 μm Cu (10%)	0.008
Drift Gas	4 cm Ar(70%)	0.024
	4 cm CO ₂ (30%)	0.006
Total		0.202

μR -Well Detector (1-shell)



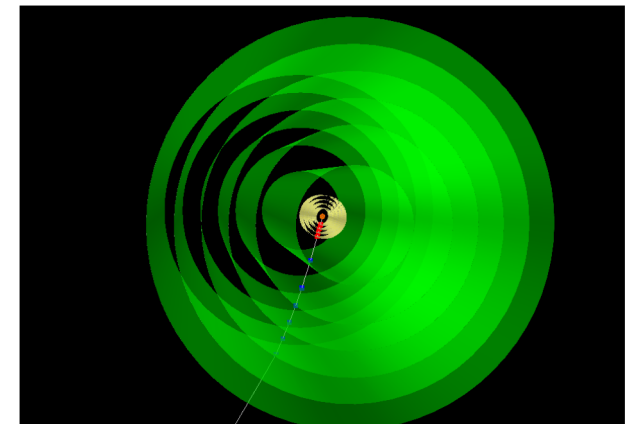
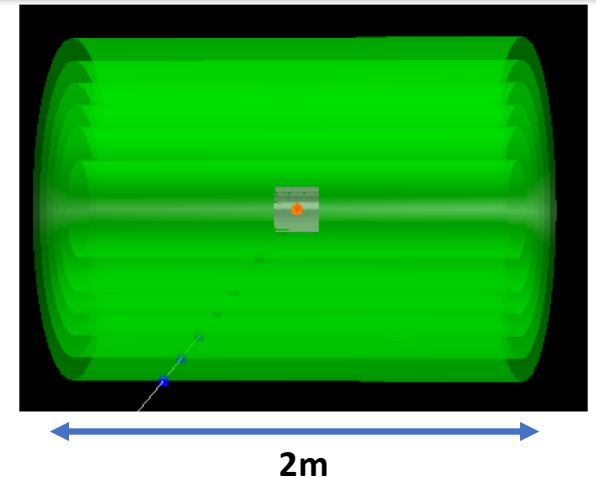
Detector Setup

❑ Cylindrical Shell Geometry

- 2 meter long cylindrical shell
- Radius (6-shell layout) = [225, 375, 475, 575, 675, 775] mm
- Digitization smears $100\ \mu\text{m}$ in tangential direction and $50\ \mu\text{m}$ in longitudinal direction (along the barrel)

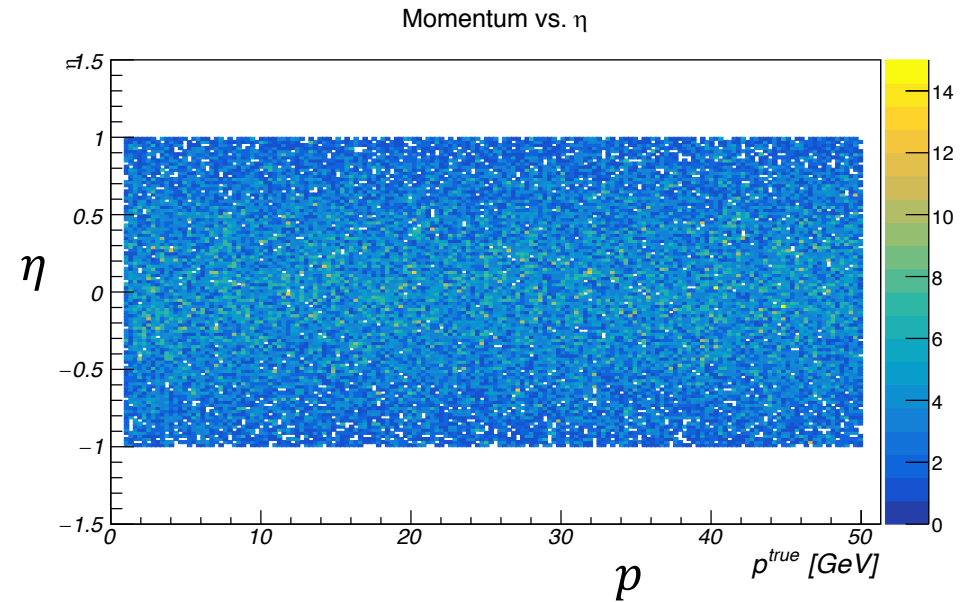
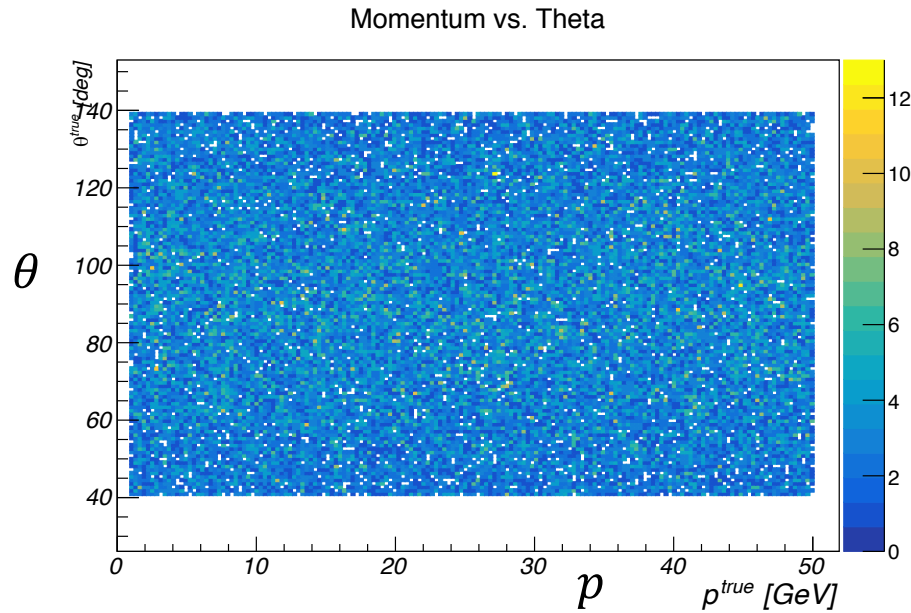
❑ 4 silicon vertex layers

- 20 cm long
- Radius = [4, 6, 8, 10] cm
- Digitization smear $20\ \mu\text{m}$, $40\ \mu\text{m}$ in x,y



Simulated Acceptance

Simulated Acceptance



○ Through π^- events in the following ranges:

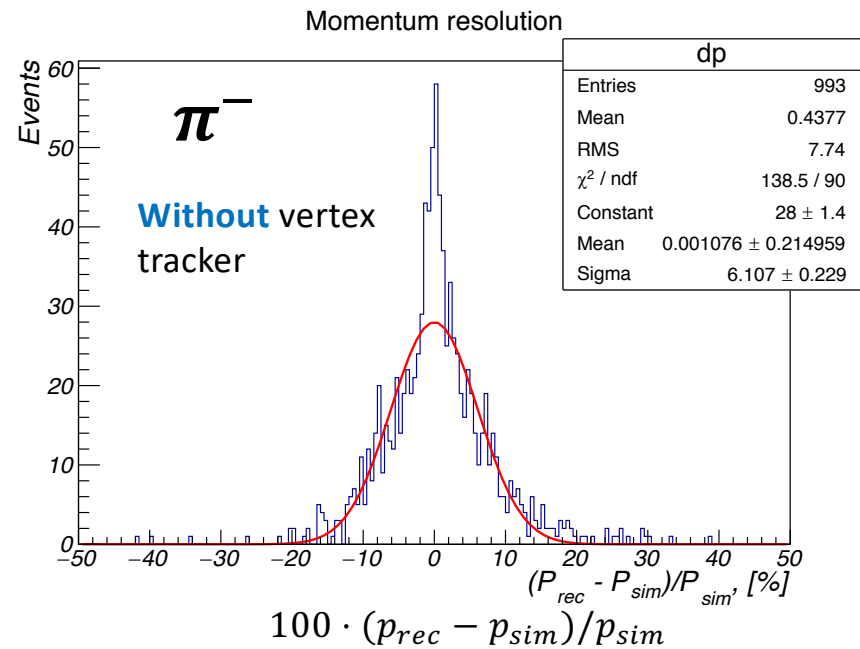
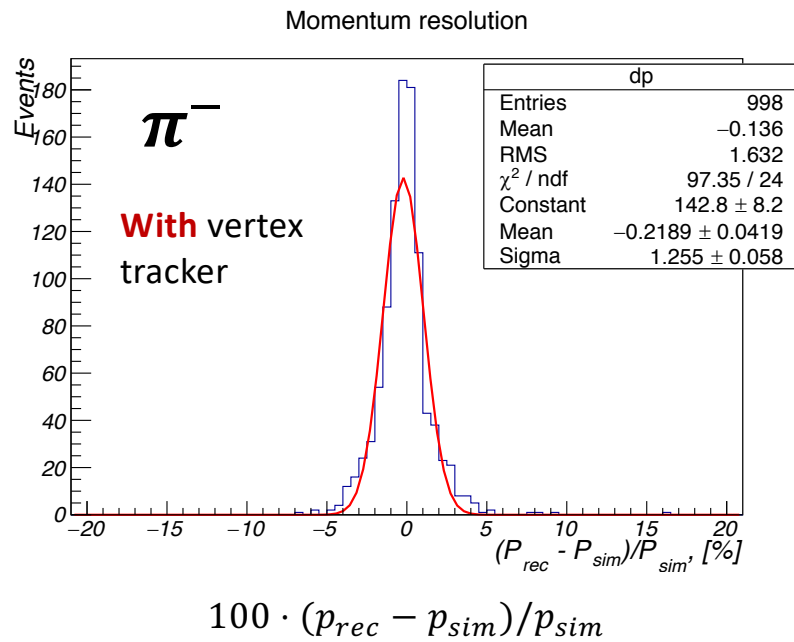
- $1 GeV \leq p \leq 50 GeV$
- $40^\circ \leq \theta \leq 140^\circ$
- $-1 \leq \eta \leq 1$

$$\eta = -\ln\left(\tan \frac{\theta}{2}\right)$$

Vertex Tracker Effect

□ Momentum Resolution: Vary Shell Number

- B = 3T, 6 shells



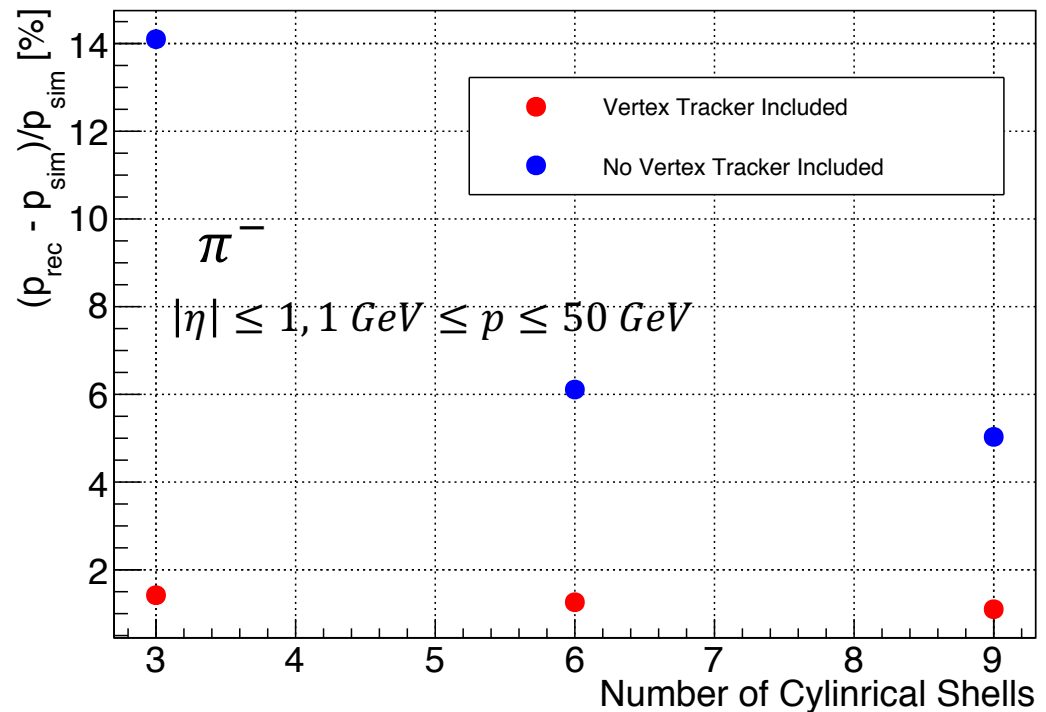
Momentum Resolution vs. Shell Layers

□ Momentum Resolution: Vary Shell Number

- B = 3T

- **Minimal** momentum resolution dependence on the number of shells used **with the vertex** detector included.
- All results from here on out used **6 shell** setup

Momentum Resolution vs. Shell Number (B = 3T)

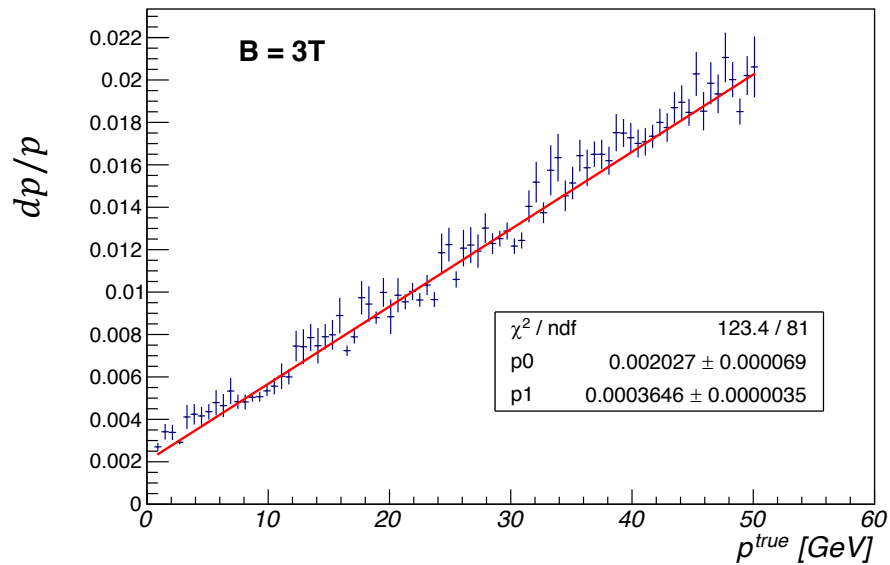


Momentum Resolution vs. Momentum

□ Momentum Resolution: Vary Shell Number

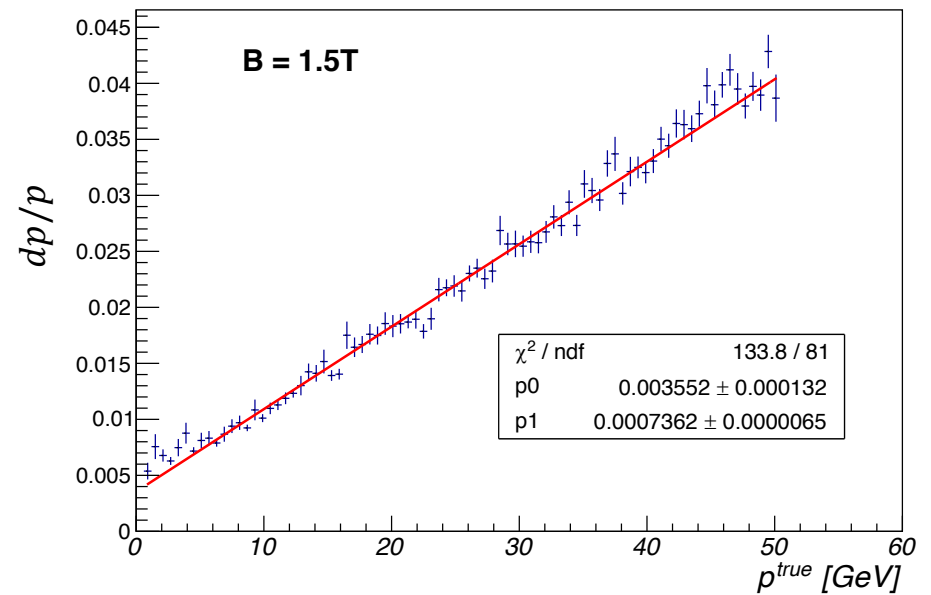
- π^- , $|\eta| \leq 1$

Momentum Resolution vs. Momentum



$$\frac{dp}{p}(B = 3T) = 0.2\% + (0.04\%) * p$$

Momentum Resolution vs. Momentum



$$\frac{dp}{p}(B = 1.5T) = 0.4\% + (0.07\%) * p$$